



June 3, 2004

Electronic Filing

Ms. Marlene Dortch
Secretary
Federal Communications Commission
The Portals
445 12th Street, S.W.
Washington, DC 20554

Re: *Wireless Broadband Access Task Force Seeks Public Comment on
Issues Related to Commission's Wireless Broadband Policies, GN
Docket No. 04-163*

Dear Ms. Dortch:

Microsoft appreciates this opportunity to respond to the Task Force's recent Public Notice.¹ Microsoft has long been a staunch advocate of the view that broadband wireless access ("BWA") (i.e., wireless, last-mile access to the Internet) is an essential component of universal broadband connectivity. Even with the marketplace's enthusiasm for the latest BWA technologies, however, Microsoft believes that the Commission needs to be actively engaged, continually looking to remove regulatory barriers to BWA's commercial success. In particular, the Commission should assure that spectrum below 1 GHz is available for BWA applications, and it should continue to pursue its other regulatory reforms aimed at enabling broader use of "smart" radios.

The economic and consumer benefits of successful, mass-market BWA implementations would be difficult to overstate. In many rural areas, the economics of cable and DSL infrastructure have been a barrier to deployment, creating zones throughout the country of second-class broadband access or, worse, no access at all. Where cable and DSL are available, BWA technology promises additional consumer benefit. With the right regulatory reforms and continued investment by entrepreneurs, BWA technology can both complement and compete with traditional wired access, further fueling the broadband era's cycle of innovation and growth.

The Emergence of Wireless Broadband Technologies and Applications

Today, wireless broadband devices are used mainly to create wireless local area networks ("WLANs") within homes, offices, universities campuses and public hotspots – that is, they

¹ *Wireless Broadband Access Task Force Seeks Public Comment on Issues Related to Commission's Wireless Broadband Policies*, Public Notice, GN Docket No. 04-163, DA 04-1266 (rel. May 5, 2004).

create a wireless link to a wired broadband connection. In the United States, there are more than 28,000 Wi-Fi public access points,² and “hot spots” are fast becoming “hot zones.” It is remarkable that the global popularity of WLANs has grown during a period when the telecommunications market has otherwise been quite depressed. This is largely because the economics of deploying such a network are so user-friendly. WLAN technology is a global, mass-market phenomenon, and consequently users reap the cost-benefits of manufacturers’ significant economies of scale. Moreover, because WLAN technology operates in unlicensed spectrum, the devices are (compared to many radio technologies) simple to buy, install and use.

Because of these favorable attributes, WLAN technology is spawning extremely creative implementations. In addition to providing standard local connectivity, WLANs are beginning to offer fundamentally different kinds of connectivity than wired networks: portable, mobile, and even temporary. Utility is limited only by the imagination, as evidenced by a few examples:

- One municipality has introduced a “floating area network” to provide mobile Wi-Fi connections to its 15,000 daily ferry commuters.³
- Other regional transit operators have begun live trials on trains of a system that provides passengers with on-board connectivity and operators with new business applications, such as on-board ticketing.⁴ In the UK, a survey of rail commuters found that 78% would use Wi-Fi on trains if it were available, and nearly as many indicated that it would be sufficient reason to choose train travel over other modes of transportation.⁵
- During the 2002 World Series, the hosting stadium had only two DSL connections to serve an impending media deluge.⁶ With only a few days lead-time, the stadium hired an “event bandwidth service provider” to provision a temporary high-speed wireless link serving dozens of print and photojournalists.⁷

² See Ed Sutherland, *What Is the Future For Hotspots?*, Wi-Fi Planet, July 15, 2003, at <http://www.80211-planet.com/news/article.php/2235511>; Mark Berniker, *Wi-Fi Hot Spot Market Picking Up*, July 10, 2003, at <http://www.80211-planet.com/news/article.php/2233721>.

³ *Washington Commuter Ferries Get Wi-Fi Go Ahead*, Wi-Fi Planet, Aug. 20, 2003, at <http://www.wi-fiplanet.com/news/article.php/3066491>.

⁴ See <http://pointshotwireless.com/customers/wisp.php> (last visited May 31, 2004). In Great Britain, industry analysts predict that by 2008, rail passengers will spend \$420 million per year on in-transit Wi-Fi services. *Broadreach and PointShot Wireless Partner to Provide On-train Wireless Internet Access*, Jan. 20, 2004, at <http://pointshotwireless.com/news/press/0401201.php>.

⁵ See <http://www.wi-fiplanet.com/news/article.php/3087291> (last visited June 3, 2004).

⁶ See Gerry Blackwell, *The Big Event (Bandwidth)*, Wi-Fi Planet, Dec. 5, 2002, at www.80211planet.com/columns/article.php/1552931. See also quotation of Neil Fariss, Senior Network Analyst for Edison Field, at <http://nextweb.net/> (last visited May 31, 2004).

⁷ Temporary links serve other exigencies as well: the same firm provided a 4 mbps Internet link for a design firm so that its employees could work while standing on line for premiere tickets to a Star Wars film. See *id.*

The creativity in the WLAN space also grows out of the scalable network architecture. A hot zone operator may be able to start by providing service in part of a market and subsequently increase its coverage seamlessly as capital and demand allow.

Naturally, the success of WLANs is prompting tremendous enthusiasm for, and investment in, the next possible breakthrough in mass-market, radio-based applications – broadband wireless access. For example, Coffman Cove, a remote village in southeastern Alaska, determined that its citizens should have broadband access and established its own broadband network using WLAN technology and satellite backhaul. There are similar stories – of public and private entrepreneurs determined that their community should have access – from Newfoundland to India and Spain to Laos. Using an array of WLAN and other technologies, operating in licensed and unlicensed spectrum, wireless ISPs (“WISPs”) are cropping up. It is likely that more than 1,000 WISPs are dappled across the country, though the vast majority of these are small, local and rural operations.

Riding this wave of enthusiasm, entrepreneurs large and small are developing new technologies, such as 802.16/WiMAX, which show promise for establishing more reliable and robust BWA connections. Such technological breakthroughs are necessary if BWA implementations are to enjoy the mass-market, scale-economies and ease-of-use attributes that have been at the core of the WLAN phenomenon. Looking even farther down the road, others are developing technologies and network architectures that could take BWA applications into new realms. Mesh networks, for example, would expand access with largely user-funded infrastructure. They are a departure from today’s common hub-and-spoke design. Instead, each end point in the network becomes another router, so that cell phones and laptops can send and receive signals from each other, rather than via an access point or cell tower. Essentially, mesh-enabled devices brought in proximity of one another could create an organically growing network.

So, there is reason for optimism. That said, the Commission should be careful not to assume that wide-scale success of BWA is a foregone conclusion. The Commission’s own efforts to promote new wireless applications over the past two decades are sprinkled with noteworthy successes, but also commercial failures. The key question, then, becomes how the Commission can use its regulatory power to increase the chances that BWA will succeed. Again, Microsoft believes the Commission should pursue two key strategies.

Spectrum Below 1 GHz is Vital to Wireless Broadband Networking

Perhaps the most important thing the Commission can do is to make sufficient amounts of the right spectrum available for wireless broadband. The development of BWA is best served by a mix of spectrum allocations: both licensed and unlicensed, including lower and higher frequencies.⁸ Most immediately, Microsoft firmly believes that the Commission should make spectrum below 1 GHz available for both licensed and unlicensed broadband.

⁸ Of course, global harmonization in allocations is also important. Through its work on the global 5 GHz allocations, the FCC has demonstrated both its understanding and leadership in this regard.

A significant challenge facing WISPs is the limited propagation characteristics of the spectrum at 2.4 GHz and 5 GHz, currently the only widely available spectrum for unlicensed public usage. Signals in these bands attenuate rapidly and are easily blocked by walls. While these bands have worked well for WLANs, last mile connectivity in both urban and rural areas is best bootstrapped in the lower bands. The lower bands allow a single access point to provide greater coverage per customer. With the broad reach possible below 1 GHz, a WISP can build a couple of access points and begin business providing service to an entire community – and invest capital and expand capacity as business warrants. In the upper bands, a WISP must build access points throughout the community to get similar coverage, which is difficult to do before it has customers. The upper bands become important in later stages of deployment, when the smaller cell sizes and higher throughput they enable can be used to increase system capacity and serve more customers.

The Commission acknowledged the need for lower band spectrum just last week. Proposing to allow unlicensed operations, including wireless broadband access, in unused portions of the 700 MHz television bands, the Commission observed: “Given the favorable propagation characteristics of the TV spectrum, these new devices could provide more effective service at greater ranges than other unlicensed devices that operate at higher frequency bands.”⁹ The Commission is right on this score, and Microsoft looks forward to participating in that proceeding.

The FCC Should Continue to Pursue its Other Spectrum Reforms

Second, the Commission should continue to reform its spectrum rules. For instance, as the use of unlicensed devices mushrooms, policymakers must address the interference that unlicensed devices can cause to each other. Consumers have been willing to tolerate interference among unlicensed devices such as between cordless phones and microwaves. However, consumers will not tolerate such interference when watching video over an unlicensed broadband network.

In addition, newer, “smart” radios can make better use of existing allocations. Innovation in smart radio technology continues at a rapid pace, with manufacturers developing ever-smarter antennas and transmission systems. Smarter radios can more easily find available spectrum and make use of it. The Commission is examining these issues and has underway a number of proceedings aimed at removing regulatory barriers to the deployment of this technology. The Commission should proceed with these efforts.

Finally, allowing higher power operation in existing unlicensed bands in places where there is little likelihood of interference, such as rural areas, will enable existing services to improve their viability by increasing the number of customers they can serve.

⁹ In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, *Notice of Proposed Rulemaking*, FCC 04-113, ¶ 7 (rel. May 25, 2004).

Ms. Marlene Dortch

June 3, 2004

Page 5 of 5

* * * * *

Microsoft strongly endorses the Commission's ongoing commitment to making broadband wireless access successful. With the right regulatory framework, wireless technologies can play a pivotal role in assuring all Americans have access to robust and reasonably priced broadband connections.

Sincerely,

A handwritten signature in black ink, appearing to read "Paula Boyd" with a stylized flourish at the end.

Jean Pierre de Vries

Chief of Incubation

Paula Boyd

Regulatory Counsel